Italian Botanist 15: 65–76 (2023)
doi: 10.3897/italianbotanist.15.98538
https://italianbotanist.pensoft.net

RESEARCH ARTICLE

Italian Botanist
Published by Società Botanica Italiana

First record of *Rhizomatophora aegopodioides* (Apiaceae) in Italy

Riccardo Pennesi[1], Emilia Cunto[2], Sandro Ballelli[1]

1 *Herbarium Universitatis Camerinensis (CAME), Unit of Plant Diversity and Ecosystems Management, School of Biosciences and Veterinary Medicine, University of Camerino, Camerino (MC), 62032, Italy* **2** *Via G. Marconi 26, Domicella (AV), 83020, Italy*

Corresponding author: Riccardo Pennesi (riccardo.pennesi@unicam.it)

Academic editor: Fabrizio Bartolucci | Received 7 December 2022 | Accepted 1 May 2023 | Published 4 May 2023

Citation: Pennesi R, Cunto E, Ballelli S (2023) First record of *Rhizomatophora aegopodioides* (Apiaceae) in Italy. Italian Botanist 15: 65–76. https://doi.org/10.3897/italianbotanist.15.98538

Abstract

The occurrence of *Rhizomatophora aegopodioides*, a species distributed in the Balkan Peninsula, Greece, southern Caucasus, Turkey and southern Russia, is reported here for the first time in Italy. It was discovered in Calabria (southern Italy) in the Argentino River Valley and along the Abatemarco River (municipality of Cosenza), localities partly included within the Pollino National Park. Information about taxonomy, nomenclature, habitat, phytosociology and distribution of this species in Italy are provided.

Keywords

Apennine, Calabria, *Peucedanum*, Umbelliferae, vascular flora

Introduction

Apiaceae Lindl. is a cosmopolitan family comprising 466 genera and about 3,820 species, found most widely in temperate Eurasia and North America (Plunkett et al. 2018). The species are not evenly distributed among genera, 41% of which are monotypic and 26% comprise only two or three species each (Pimenov and Leonov 1993). Sixty percent of the total number of species have been assigned to a relatively small number of large genera containing over 20 species each (Spalik et al. 2001). These genera include *Ferula* L. (170 species), *Peucedanum* L. (100–120), *Seseli* L. (100–120), and *Ligusticum* L. (40–50), all of which are considered polyphyletic by Katz-Downie et al. (1999) and Downie et al. (2000).

Copyright *Riccardo Pennesi et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Peucedanum sensu lato, distributed in Eurasia and Africa, is one of the most taxonomically complex groups in the Apiaceae (Pimenov and Leonov 1993). Based on morphological and molecular studies, the genus is now reduced to *P. officinale* L. and a few other species, and several distinct genera are recognized (i.e., Reduron et al. 1997; Spalik et al. 2004; Pimenov et al. 2007; Pimenov and Ostroumova 2012; Lei et al. 2022).

During field surveys in southern Italy (Calabria administrative region) carried out in 2016, we discovered several individuals of an unknown species belonging to the Apiaceae not corresponding to any recorded taxon for the Italian vascular flora (Bartolucci et al. 2018; Galasso et al. 2018; Stinca and Ricciardi 2018). This plant was preliminarily identified as *Rhizomatophora aegopodioides* (Boiss.) Pimenov, through literature and herbarium research, a species distributed in the Balkan Peninsula, Greece, southern Caucasus, Turkey, and southern Russia (POWO 2023).

The purpose of this study was to verify the correct identification of this disjunct population occurring in southern Italy and to distinguish it from related genera occurring in Italy. Furthermore, to increase knowledge on the Italian vascular flora, we provide taxonomic, phytosociological, and distributive data relating to this new finding.

Material and method

Field investigations were carried out in September 2016 in Calabria (southern Italy) along the Abatemarco River (Santa Maria del Cedro, Cosenza; WGS 84: 39°44'25"N, 15°52'04.6"E, Fig. 1) and in the Argentino River Valley (Orsomarso, Cosenza; WGS 84: 39°47'42.6"N, 15°55'18.0"E, Fig. 1). The latter locality falls in the Site of Community Importance "Valle del Fiume Argentino" (IT9310023) within the Pollino National Park. Ten samples were collected and one individual was transplanted in the "Carmela Cortini" Botanical Garden of the University of Camerino for *ex situ* conservation purposes.

Careful surveys of relevant literature to find existing records of the species in Italy were performed (Bartolucci et al. 2018 and Galasso et al. 2018 and subsequent updates reported in the Portal to the Flora of Italy 2023; Stinca and Ricciardi 2018). Floristic and phytosociological studies concerning the studied area (Terracciano 1891, 1896, 1900; Gavioli 1932; Maiorca and Spampinato 1994, 1999; Bernardo 2002; Mercurio et al. 2007; Scarfò et al. 2008), or more generally southern Italy and Calabria (Bernardo et al. 2012; Maiorca and Puntillo 2015; Roma-Marzio et al. 2016; Conti et al. 2019; Rosati et al. 2020; Stinca et al. 2021; Spampinato et al. 2022) were also analysed. Identification of the collected specimens was performed following the morphological descriptions and the analytical keys in Seidel (1889), Vandas (1889), Tutin et al. (1968), Chamberlain (1972), Hartvig (1986), Frey (1989), and Pimevov and Ostroumova (2012). The original description of the species was also studied (Boisser 1872). Furthermore, a phytosociological survey was carried out using the Braun-Blanquet approach (1964). All the collected specimens are kept in Herbarium Universitatis Camerinensis (CAME; herbarium acronym follows Thiers 2023).

Figure 1. Italian localities of *Rhizomatophora aegopodioides* (red dots, Google Earth view): 1, Santa Maria del Cedro; 2, Orsomarso.

Results and discussion

***Rhizomatophora aegopodioides* (Boiss.) Pimenov, Umbelliferae Russia 284 (2012)**

≡ *Physospermum aegopodioides* Boiss., Fl. Orient. [Boissier] 2: 923 (1872).
≡ *Peucedanum aegopodioides* (Boiss.) Vandas, Sitzungsber. Königl. Böhm. Ges. Wiss., Math.-Naturwiss. Cl. 1888: 449 (1889).
≡ *Cervaria aegopodioides* (Boiss.) Pimenov, Vestn. Moskovsk. Gosud. Univ., ser. 16, Biol. 4: 37 (1982).

Ind. Loc. "Hab. supra Brusnik in districtu Bitolia Macedoniae (Orph!)".

Type (see Pimenov and Ostroumova 2012). "Supra Brusnik prope Bitolia Macedoniae. 25 July 1862. *Th.G. Orphanides 376*" (holo: G-BOIS; iso: G, GB).

Species description from the Italian (Calabria) material (Figs 2, 3). Erect perennial plants (70–120 cm), with long horizontal rhizomes; solitary, fistulous, glabrous, striated stems; large leaves, 2–3 ternatisect, non-swollen sheaths, broadly triangular laminae, with oblong lobes, glabrous, petiolate, with a minutely rough margin, as well as in the main veins and apiculate teeth; petioles striated round in section, hollow; umbels with 20–35 unequal, slender, minutely scabrous rays mainly on one side; bracts none, 3 or 6, lesiniform; umbrellas with more than 10 rays and numerous lesiniform bracteoles, always present; petals white, largely ovate, erect apex slightly emarginated, lobes swollen; mericarps glabrous (5 × 6.5–7 mm), broadly elliptical or almost round,

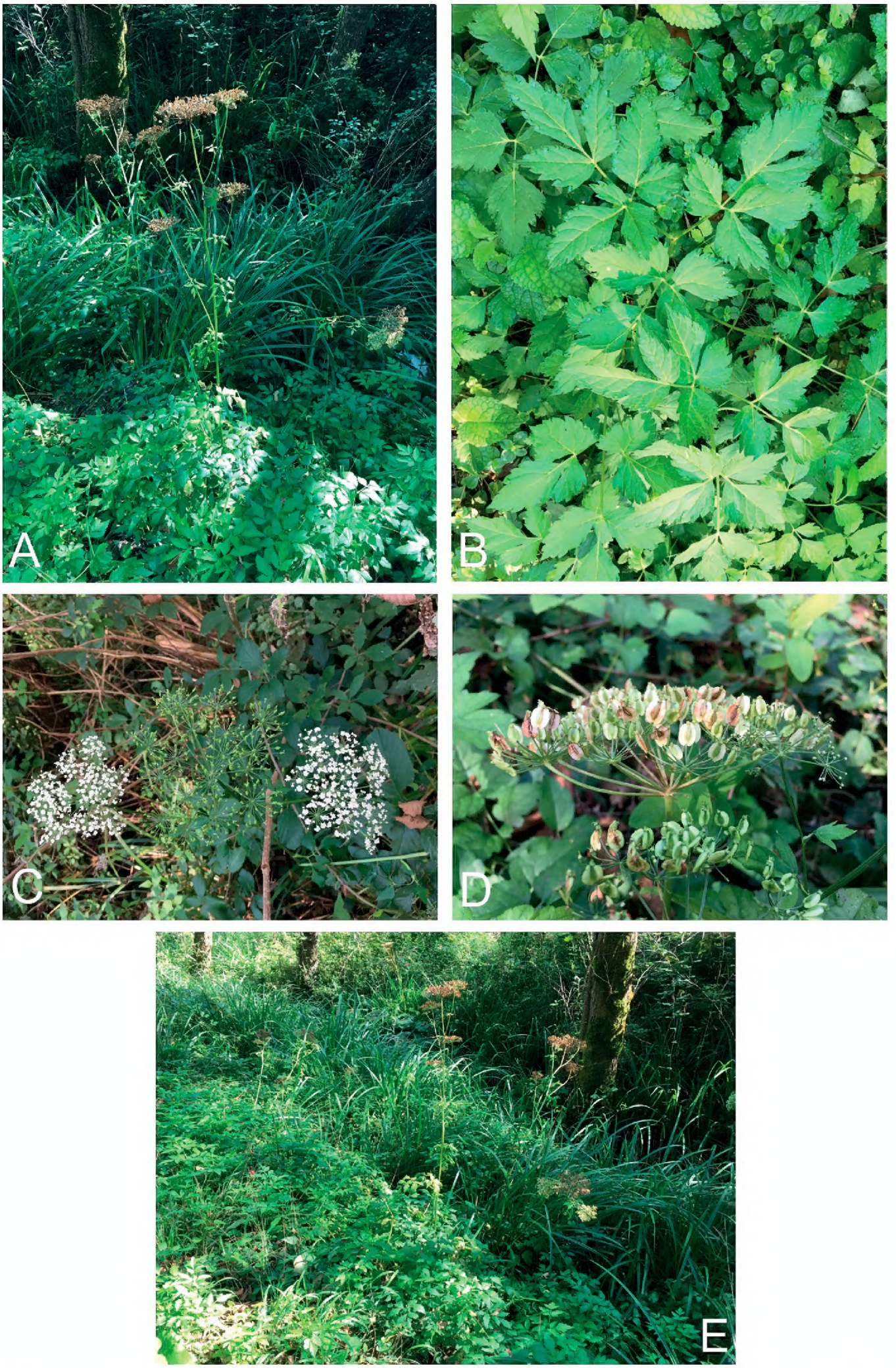

Figure 2. *Rhizomatophora aegopodioides* (Calabria, Santa Maria del Cedro, middle stretch of the Abatemarco River, photo R. Pennesi) **A** whole plant **B** basal leaves **C** flowers **D** fruits **E** habitat.

Herbarium S. Ballelli
RISERVA NATURALE ORIENTATA "VALLE DEL FIUME ARGENTINO"
Rhizomatophora aegopodioides (Boiss.) Pimenov (Apiaceae)
Loc.: tratto iniziale della "Valle del Fiume Argentino" (Orsomarso, CS)
Esp. ovest
Alt. 130-150 m
Hab. sponde e ambienti umidi limitrofi
Substr. calcareo
Data 26 settembre 2016
Coord. GPS UTM: 33 S - 578909 - 4405429 N
Leg. S. Ballelli, R. Pennesi, E. Cunto
Det. S. Ballelli, R. Pennesi

Figure 3. Herbarium specimen of *Rhizomatophora aegopodioides* kept in CAME.

dorsally compressed, broadly winged (1.5–2 mm), bifid carpophores; flat-conical stylopods, with wavy margin; evident filiform dorsal ribs.

Distribution. *Rhizomatophora aegopodioides* is distributed in the Balkan Peninsula (Albania, Bosnia-Herzegovina, Bulgaria, Montenegro, Croatia, Macedonia, and Serbia), Greece (central-eastern and central-northern; northern and southern Pindus), southern Caucasus (Georgia, Armenia, Azerbaijan), Turkey, southern Russia (POWO 2023), and here reported for southern Italy (Fig. 4). In Calabria, the species is widespread along the banks of the Abatemarco and Argentino rivers and in the adjacent wetlands. Currently, its presence in the Italian peninsula is the westernmost stand of the distribution range. Furthermore, the Calabrian population shows the lowest altitude known for this species. This may be due to the strong thermal inversion in the valley bottoms of the Argentino River Reserve (Maiorca and Spampinato 1999).

Habitat. In Italy, it grows in hygrophilous forests, alder forests, riverbanks, and freshwater habitats at about 100–200 m a.s.l. The results of one relevé carried out in the Santa Maria Del Cedro locality are shown in Table 1.

Phenology. Flowering in August-September, fruiting in September-October.

Chromosome number. 2n = 22 (Kuzmanov et al. 1977 as *Peucedanum aegopodioides*, material from Bulgaria, M. Ljulin; Strid and Franzėn 1983 as *Peucedanum aegopodioides*, material from Greece, M. Olympus)].

Taxonomic remarks. The monotypic genus *Rhizomatophora* Pimenov is characterized by perennial plants, growing in hygrophilous forests, alder forests, riverbanks, wetlands, and freshwater habitats. This genus is morphologically close to *Cervaria* s.str. and *Peucedanum* s.str. In Italy, according to Bartolucci et al. (2018) and subsequent updates summarized in the Portal to the Flora of Italy (2023; see also Martellos et al. 2020) three taxa of *Peucedanum* and one species of *Cervaria* are reported: *P. officinale* L. subsp. *officinale* (native), *P. paniculatum* Loisel. (cryptogenic), *P. coriaceum* Rchb. (native, but not recently confirmed), and *C. rivini* Gaertn. (native). Stinca and Ricciardi (2018) indicate three *Peucedanum* and one *Cervaria* taxa in the second edition of "Flora d'Italia": *P. officinale* subsp. *officinale* (native), *P. paniculatum* (probably casual alien species), *P. coriaceum* (not recently confirmed and probably locally extinct)], and *C. rivini* (native).

Pimenov and Ostroumova (2012) provided the following description for the genus *Rhizomatophora*: leaves 2–3 ternatisect; leaflets petiolulate, broad, ovate to oblong; mar-

Table 1. Relevé on Santa Maria del Cedro, middle stretch of the Abatemarco River, 25/09/2016, 127 m a.s.l. (WGS 84: 39°44'25.6"N, 15°52'04.6"E). The nomenclature of the cited species and subspecies follows Bartolucci et al. (2018).

Alnus glutinosa (L.) Gaertn. (1.1); *Populus nigra* L. subsp. *nigra* (1.1); ***Rhizomatophora aegopodioides*** (Boiss.) Pimenov (3.3); *Carex pendula* Huds. (3.3); *Solanum dulcamara* L. (2.2); *Mentha aquatica* L. subsp. *aquatica* (1.2); *Equisetum telmateia* Ehrh. (1.1); *Brachypodium sylvaticum* (Huds.) P.Beauv. (+.2); *Juncus conglomeratus* L. (+.2); *Tussilago farfara* L. (+.2); *Vinca major* L. subsp. *major* (+.2); *Bidens tripartita* L. subsp. *tripartita* (+); *Cirsium creticum* (Lam.) d'Urv. subsp. *triumfettii* (Lacaita) K.Werner (+); *Clematis vitalba* L. (+); *Convolvulus sepium* L. (+); *Epilobium hirsutum* L. (+); *Epilobium parviflorum* Schreb. (+); *Eupatorium cannabinum* L. subsp. *cannabinum* (+); *Ficus carica* L. (+); *Geranium versicolor* L. (+); *Lamium maculatum* L. (+); *Melissa officinalis* L. subsp. *altissima* (Sm.) Arcang. (+); *Persicaria maculosa* Gray (+); *Pulicaria dysenterica* (L.) Bernh. (+); *Rubia peregrina* L. (+); *Salvia glutinosa* L. (+).

Figure 4. Distribution of *Rhizomatophora aegopodioides* showing the Italian record from Calabria (red dot). Image from POWO (2023, modified).

gins dentate or incised. Bracts absent or 3–6, lanceolate to subulate; rays many, velvety; bracteoles many, subulate; pedicels many, minutely pubescent. Calyx lobes triangulate, membranous at margin; petals white or pinkish; stylopodium plane to conical, wavy at margin. Fruits compressed dorsally, glabrous; dorsal ribs filiform, marginal ribs broadly winged; commissure broad; vittae minute, vallecular 1, commissural 2; rib secretory ducts large, 2 in each rib. Seed face plane. The genus *Rhizomatophora* differs from *Cervaria* s.str. for the long horizontal rhizomes, the petioles and stems fistulous, the largely triangular teeth of the calyx, the obtuse margin of the albumen, the marginal crests of the broadly winged and translucent mericarps, unistrate mesocarps, smooth membranous cells (without an inner layer of tangentially elongated cells), and continuous, rather broad (not isolated, minute) secretory canals. *Rhizomatophora* is also easily recognizable from the related genus *Peucedanum* s.str. by the terminal lobes of the leaves, the long rhizomes, the petioles and stems fistulous, the widely winged mericarps with light striations and continuous secretory canals (Pimenov and Ostroumova 2012). The morphological characters distinguishing *Rhizomatophora* (based on the samples collected in Calabria) from related genera (i.e., *Peucedanum* and *Cervaria*) of the Italian vascular flora are shown in Table 2.

Specimens examined. Italy. Calabria, Orsomarso (Cosenza), initial section of the Argentino River Valley (39°47'42.6"N, 15°55'18.0"E), esp. west, alt. 130–150 m. a.s.l., banks and surrounding wetlands, calcareous substr., 26 September 2016; *S. Ballelli*, *R. Pennesi*, *E. Cunto s.n.* (CAME); Calabria, Santa Maria del Cedro (Cosenza), along the middle section of the Abatemarco River (39°44'25.6"N, 15°52'04.6"E), 120–140 m. a.s.l., banks and surrounding wetlands, calcareous substr., 25 September 2016, *S. Ballelli*, *R. Pennesi*, *E. Cunto s.n.* (CAME); **Greece.** Greece, prope Bitolia Macedoniae, 06 August 1862, *T.G. Orphanides 1017* (JE barcodes JE00000057 [digital photo!], JE00000058 [digital photo!]); prope Vodena Macedoniae, *s.d.*, *T.G. Orphanides 1017* (W No. 1889-

Table 2. Morphological characters distinguishing *Rhizomatophora aegopodioides* (Calabrian population) from related genera of the Italian flora. Morphological features of *Peucedanum* and *Cervaria* follow Stinca and Ricciardi (2018).

Morphological characters	***Rhizomatophora***	***Peucedanum* s.str.**	***Cervaria* s.str.**
Height	70–120 cm	20–200 cm	20–150 cm
Leaves	2–3 ternatisect	2–6 ternate	2–3 pinnatisect
Leaves margin	dentate-apiculate segments	linear segments	dentate-apiculate segments
Umbel rays (primary rays)	20–35, unequal, slender, minutely scabrous mainly on one side	4–50	9–35, pubescent-scabrous on internal side
Bracts	0, 3 or 6, lesiniform	0–6, lesiniform	4–15, linear, reflexed
Bracteoles	erect, numerous, always present	numerous	reflexed, numerous
Petals	white, largely ovate, swollen lobes	white to yellow	white
Petal apex	erect, slightly emarginated	curved towards the center of the flower (inflexed)	curved towards the center of the flower (inflexed)
Mericarps	5 × 6.5–7 mm, glabrous, broadly winged (1.5–2 mm), elliptical or almost round	4–4.5 × 6.5–12 mm, winged (0.5–2 mm), elliptical or oblong	3–4.5 × 4–9 mm, winged (0.5–1.4 mm), elliptical or suborbicular
Dorsal ribs	evident, filiform	evident	inconspicuous

0024958 [digital photo!]; **Serbia.** Jugozapadna: Priboj, Sjeverin (Sutjeska reka-klisura, dornji deo), 43°35.266'N, 19°22.225'E, stene, krecnjak, 400–450 m, 13 August 2008, *Niketic M.*, *Tomovic G. s.n.* (BEOU No. 27989!); Prvriek, dist. Vranja, ad rivulos, *G. Ilić s n.* (BEO No. 16105!); Serbia austr. prope Wranja. *G. Ilić s.n.* (W No. 1895-0000240 [digital photo!]); **Bulgaria.** Bei Lowtsche, 4 July 1898, *Urumoff s.n.* (W No. 1926-0027189 [digital photo!]); **Bosnia and Herzegovina.** In glareosis calcareis faucis Prača, 570 m.; alt. 570 m, 20 July 1920, K. Malý s.n. (W No. 1961-0005131 [digital photo!]).

Conclusion

The discovery of *Rhizomatophora aegopodioides* in Italy is particularly relevant because it provides a contribution to the knowledge on its distribution at the European level. The genus *Rhizomatophora* is new for Italy, which hosts the richest vascular flora in Europe, and is second in the Mediterranean area only to Turkey (Bartolucci et al. 2021, 2022). The discovery of *R. aegopodioides* adds to the recent new acquisitions, for the Italian native vascular flora, of plants with an eastern range (e.g., Bartolucci and Conti 2016; Peruzzi 2016; Peruzzi et al. 2017; Wagensommer et al. 2017; Bartolucci et al. 2022; Conti and Bartolucci 2023), once again underlining the importance of floristic and taxonomic research from a conservationist perspective.

In our opinion, further field surveys are indispensable to define the effective distribution area and ecology of *R. aegopodioides* in Italy, and to understand the origin of these disjointed populations. Furthermore, it would be desirable to monitor the species in order to assess the conservation status of the population described here.

Acknowledgements

We would like to thank Dmitar Lakušić and his staff at the Herbarium of Belgrade University (BEOU) and Marjan Niketić at the Herbarium of Belgrade Natural History Museum (BEO) for providing the herbarium specimens.

References

Bartolucci F, Conti F (2016) *Alyssum desertorum* Stapf (Brassicaceae), new for the Italian flora. Acta Botanica Croatica 75(1): 149–152. https://doi.org/10.1515/botcro-2016-0006

Bartolucci F, De Santis E, Conti F (2022) Nomenclatural synopsis, revised distribution and conservation status of *Ranunculus gracilis* (Ranunculaceae) in Italy. Plants 11(22): e3094. https://doi.org/10.3390/plants11223094

Bartolucci F, Galasso G, Peruzzi L, Conti F (2021) Report 2020 on plant biodiversity in Italy: native and alien vascular flora. Natural History Sciences 8(1): 41–54. https://doi.org/10.4081/nhs.2021.520

Bartolucci F, Galasso G, Peruzzi L, Conti F (2022) Report 2021 on plant biodiversity in Italy: native and alien vascular flora. Natural History Sciences 10(1): 41–50. https://doi.org/10.4081/nhs.2022.623

Bartolucci F, Peruzzi L, Galasso G, Albano A, Alessandrini A, Ardenghi NMG, Astuti G, Bacchetta G, Ballelli S, Banfi E, Barberis G, Bernardo L, Bouvet D, Bovio M, Cecchi L, Di Pietro R, Domina G, Fascetti S, Fenu G, Festi F, Foggi B, Gallo L, Gottschlich G, Gubellini L, Iamonico D, Iberite M, Jiménez-Mejías P, Lattanzi E, Marchetti D, Martinetto E, Masin RR, Medagli P, Passalacqua NG, Peccenini S, Pennesi R, Pierini B, Poldini L, Prosser F, Raimondo FM, Roma-Marzio F, Rosati L, Santangelo A, Scoppola A, Scortegagna S, Selvaggi A, Selvi F, Soldano A, Stinca A, Wagensommer RP, Wilhalm T, Conti F (2018) An updated checklist of the vascular flora native to Italy. Plant Biosystems 152(2): 179–303. https://doi.org/10.1080/11263504.2017.1419996

Bernardo L (2002) Fiori e piante del Parco del Pollino (2nd edn.). Edizioni Prometeo, Castrovillari (Cosenza).

Bernardo L, Bartolucci F, Cancellieri L, Costalonga S, Galasso G, Galesi R, Gargano D, Iberite M, Iocchi M, Lattanzi E, Lavezzo P, Magrini S, Peccenini S, Sciandrello S, Scoppola A, Signorino G, Tilia A, Spampinato G (2012) Contributo alla conoscenza floristica della Calabria: resoconto dell'escursione del Gruppo di Floristica (SBI) nel 2008 nella Presila Catanzarese. Informatore Botanico Italiano 44(1): 125–151.

Boissier E (1872) Flora Orientalis (Vol. 2). (H. Georg), Basel, Genéve.

Braun-Blanquet J (1964) Pflanzensoziologie. Springer Verlag, Wien, New York, 865 pp. https://doi.org/10.1007/978-3-7091-8110-2

Chamberlain DF (1972) *Peucedanum aegopodioides* (Boiss.) Vandas. In: Davis PH (Ed.) Flora of Turkey and the East Aegean Islands (Vol. 4). Edinburgh University Press, Edinburgh, 480 pp.

Conti F, Bartolucci F (2023) Taxonomy and distribution of *Spiraea hypericifolia* in Italy and typification of the name *S. flabellata* (Rosaceae). Plants 12: e536. https://doi.org/10.3390/plants12030536

Conti F, Falcinelli F, Giacanelli V, Paolucci M, Pirone G, Proietti E, Stinca A, Bartolucci F (2019) New floristic data of vascular plants from central and southern Italy. Flora Mediterranea 29: 215–222. https://doi.org/10.7320/FlMedit29.215

Downie SR, Watson MF, Spalik K, Katz-Downie DS (2000) Molecular systematics of Old World Apioideae (Apiaceae): relationships among some members of tribe Peucedaneae *sensu lato*, the placement of several island endemics, and resolution within the apioid superclade. Canadian Journal of Botany 78(4): 506–528. https://doi.org/10.1139/b00-02

Frey R (1989) Taxonomische Revision der Gattung *Peucedanum*: Sektion *Peucedanum* und Sektion *Palimbioidea* (*Umbelliferae*). Candollea 44: 257–327.

Galasso G, Conti F, Peruzzi L, Ardenghi NMG, Banfi E, Celesti-Grapow L, Albano A, Alessandrini A, Bacchetta G, Ballelli S, Bandini Mazzanti M, Barberis G, Bernardo L, Blasi C, Bouvet D, Bovio M, Cecchi L, Del Guacchio E, Domina G, Fascetti S, Gallo L, Gubellini L, Guiggi A, Iamonico D, Iberite M, Jiménez-Mejías P, Lattanzi E, Marchetti D, Martinetto E, Masin RR, Medagli P, Passalacqua NG, Peccenini S, Pennesi R, Pierini B, Podda L, Poldini L, Prosser F, Raimondo FM, Roma-Marzio F, Rosati L, Santangelo A, Scoppola A, Scortegagna S, Selvaggi A, Selvi F, Soldano A, Stinca A, Wagensommer RP, Wilhalm T, Bartolucci F (2018) An updated checklist of the vascular flora alien to Italy. Plant Biosystems 152(3): 556–592. https://doi.org/10.1080/11263504.2018.1441197

Gavioli O (1932) Contributo allo studio della Flora del M. Pollino (Appennino Calabro-Lucano). Archivio Botanico e Biogeografico Italiano 8: 46–80.

Hartvig P (1986) *Peucedanum* L. In: Strid A (Ed.) Mountain flora of Greece (Vol. 1). Cambridge University Press, Cambridge, 714–722.

Katz-Downie DS, Valiejo-Roman CM, Terentieva EI, Troitsky AV, Pimenov MG, Lee BY, Downie SR (1999) Towards a molecular phylogeny of Apiaceae subfamily Apioideae: additional information from nuclear ribosomal DNA ITS sequences. Plant Systematics and Evolution 216(3–4): 167–195. https://doi.org/10.1007/BF01084397

Kuzmanov BA, Andreev N, Georgieva S (1977) In: Löve Á (1977) IOPB chromosome number reports LVII. Taxon 26: 443–452. https://doi.org/10.1002/j.1996-8175.1977.tb04204.x

Lei J-Q, Liu C-K, Cai J, Price M, Zhou S-D, He X-J (2022) Evidence from phylogenomics and morphology provide insights into the phylogeny, plastome evolution, and taxonomy of *Kitagawia*. Plants 11(23): e3275. https://doi.org/10.3390/plants11233275

Maiorca G, Puntillo D (2015) Contributi alla conoscenza floristica della Catena Costiera (Calabria). 1. La forra della Fiumara dei Bagni. Informatore Botanico Italiano 47(2): 187–204.

Maiorca G, Spampinato G (1994) The vascular flora of Argentino River valley, a nature reserve in NW Calabria (Italy). Flora Mediterranea 4: 49–100.

Maiorca G, Spampinato G (1999) La vegetazione della riserva naturale orientata "Valle del fiume Argentino"(Calabria nord-occidentale). Fitosociologia 36(2): 15–60.

Martellos S, Bartolucci F, Conti F, Galasso G, Moro A, Pennesi R, Peruzzi L, Pittao E, Nimis PL (2020) FlorItaly – the portal to the Flora of Italy. PhytoKeys 156: 55–71. https://doi.org/10.3897/phytokeys.156.54023

Mercurio R, Bagnato S, Scarfò F, Spampinato G (2007) I tipi forestali del versante occidentale del Parco Nazionale del Pollino. Edizioni Laruffa, Reggio Calabria.

Peruzzi L (2016) *Crocus heuffelianus* (Iridaceae), a new record for the Italian flora. Phytotaxa 261(3): 291–294. https://doi.org/10.11646/phytotaxa.261.3.10

Peruzzi L, Innangi M, Tatino F, Santangelo A (2017) *Fritillaria messanensis* subsp. *gracilis* (Liliaceae), a new record for the Italian flora (S Italy). Phytotaxa 307(2): 167–170. https://doi.org/10.11646/phytotaxa.307.2.11

Pimenov MG, Kljuykov EV, Ostroumova TA (2007) Critical taxonomic analysis of *Dichoropetalum*, *Johrenia*, *Zeravschania* and related genera of Umbelliferae-Apioideae-Peucedaneae. Willdenowia 37(2): 465–502. https://doi.org/10.3372/wi.37.37208

Pimenov MG, Leonov MV (1993) The Genera of the Umbelliferae. A Nomenclator. Royal Botanical Gardens, Kew & Botanical Garden of Moscow University.

Pimenov MG, Ostroumova TA (2012) Zontichnye (Umbelliferae) Rossii [Umbelliferae of Russia]. KMK Scientific Press, Moscow. [In Russian]

Plunkett GM, Pimenov MG, Reduron JP, Kljuykov EV, van Wyk BE, Ostroumova TA, Henwood MJ, Tilney PM, Spalik K, Watson MF, Lee BY, Pu FD, Webb CJ, Hart JM, Mitchell AD, Muckensturm B (2018) Genera of Apiaceae. In: Kadereit JW, Bittrich V, Kubitzki K (Eds) The Families and Genera of Vascular Plants (Vol. XV). Flowering plants. Eudicots: Apiales, Gentianales (except Rubiaceae). Cham: Springer International Publishing, 9–206. https://doi.org/10.1007/978-3-319-93605-5_2

Portal to the Flora of Italy (2023) Portale della Flora d'Italia/Portal to the Flora of Italy. 2022.1. https://dryades.units.it/floritaly/ [Accessed 18.04.2023]

POWO (2023) Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet. http://www.plantsoftheworldonline.org/ [Accessed 14.04.2023]

Reduron JP, Charpin A, Pimenov MG (1997) Contribution a la nomenclature generique des Apiaceae (Ombelliferes). Le Journal de Botanique de la Société de botanique de France 1: 91–104. https://doi.org/10.3406/jobot.1997.1657

Roma-Marzo F, Bernardo L, Liguori P, Peruzzi L (2016) Vascular flora of Monte Sparviere (Southern Italy, Pollino Massif). Atti della Societa Toscana di Scienze Naturali 122: 79–94. https://doi.org/10.2424/ASTSN.M.2015.08

Rosati L, Fascetti S, Romano VA, Potenza G, Lapenna MR, Capano A, Nicoletti P, Farris E, De Lange PJ, Del Vico E, Facioni L, Fanfarillo E, Lattanzi E, Cano-Ortiz A, Marignani M, Fogu MC, Bazzato E, Lallai E, Laface VLA, Musarella CM, Spampinato G, Mei G, Misano G, Salerno G, Esposito A, Stinca A (2020) New chorological data for the Italian vascular flora. Diversity 12(1): 22. https://doi.org/10.3390/d12010022

Scarfò F, Mercurio R, Bagnato S (2008) I tipi forestali della Riserva Naturale Orientata Valle del Fiume Argentino (Orsomarso, CS). Forest@ 5(4): 233–252. https://doi.org/10.3832/efor0536-0050233

Seidel CF (1889) VIII. *Peucedanum aegopodioides*. Sitzungsberichte und Abhandlungen der Naturwissenschaftlichen Gesellschaft Isis in Dresden 1888: 86–92.

Spalik K, Reduron JP, Downie SR (2004) The phylogenetic position of *Peucedanum* sensu lato and allied genera and their placement in tribe Selineae (Apiaceae, subfamily Apioideae). Plant Systematics and Evolution 243(3–4): 189–210. https://doi.org/10.1007/s00606-003-0066-2

Spalik K, Wojewódzka A, Downie SR (2001) The delimitation of genera in Apiaceae with examples from Scandiceae subtribe Scandicinae. Edinburgh Journal of Botany 58(2): 331–346. https://doi.org/10.1017/S096042860100066X

Spampinato G, Laface VLA, Posillipo G, Ortiz AC, Canas RQ, Musarella CM (2022) Alien flora in Calabria (Southern Italy): an updated checklist. Biological Invasions 24: 2323–2334. https://doi.org/10.1007/s10530-022-02800-y

Stinca A, Musarella CM, Rosati L, Laface VLA, Licht W, Fanfarillo E, Wagensommer RP, Galasso G, Fascetti S, Esposito A, Fiaschi T, Nicolella G, Chianese G, Ciaschetti G, Salerno G, Fortini P, Di Pietro R, Perrino EV, Angiolini C, De Simone L, Mei G (2021) Italian Vascular Flora: New Findings, Updates and Exploration of Floristic Similarities between Regions. Diversity 13: e600. https://doi.org/10.3390/d13110600

Stinca A, Ricciardi M (2018) Fam. 176. Apiaceae (=Umbelliferae nom. conserv.). In: Pignatti S, Guarino R, La Rosa M (2018) Flora d'Italia 3. Edagricole di New Business Media (2nd edn.). Milano, Italy, 524–633.

Strid A, Franzèn R (1983) Apiaceae: *Peucedanum aegopodioides* (Boiss.) Vandas. In: Löve A (Ed.) IOPB chromosome number reports LXXVIII. Taxon 32(1): 138–140. https://doi.org/10.1002/j.1996-8175.1983.tb02410.x

Terracciano N (1891) Synopsis Plantarum vascularium Montis Pollini. Annuario del Reale Istituto Botanico di Roma 4: 1–191. https://doi.org/10.5962/bhl.title.10001

Terracciano N (1896) Intorno alla flora del monte Pollino e delle terre adiacenti. Atti dell'Accademia delle Scienze Fisiche e Matematiche, ser. 2, 8(9): 1–18.

Terracciano N (1900) Addenda ad synopsis plantarum vascularium Montis Pollini. Annuario del Reale Istituto Botanico di Roma 9: 23–88.

Thiers B (2023) Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/science/ih [Accessed 18.04.2023]

Tutin TG (1968) *Peucedanum aegopodioides* (Boiss.) Vandas. In: Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA (Eds) Flora Europaea. Cambridge University Press, Cambridge 2: e362.

Vandas K (1889) Beiträge zur Kenntnis der Flora Bulgariens. Sitzungsberichte der königlichen Böhmischen Gesellschaft der Wissenschaften 1888(38): 430–453. https://doi.org/10.1007/BF01638757

Wagensommer RP, Bartolucci F, Fiorentino M, Wolfgang L, Peccenini S, Perrino EV, Venanzoni R (2017) First record for the flora of Italy and lectotypification of the name *Linum elegans* (Linaceae). Phytotaxa 296(2): 161–170. https://doi.org/10.11646/phytotaxa.296.2.5